APPENDIX VIII

DESIGN OF HOT-BLAST STOVES

By A. D. WILLIAMS

A. E. MACCOUN, in his paper before the American Iron and Steel Institute, May 28, 1915, showed the temperature distribution and the approximate isotherms for a Cowper stove at the Edgar Thomson Furnaces. The isotherms, being those taken immediately after the stove went on gas and just before going on blast, indicate that the hot gases, in cooling, tend to flow through those passes which lose the most heat, those closest to the shell of the stove, and that the blast, in heating, tends to pass through the hottest passes, those in the central portion of the stove. This distribution follows natural laws and cannot be changed except by the application of sufficient insulation around the outside of the brickwork to reduce the amount of heat lost through the shell of the stove. Changing the height of the bridge wall or the dome of the stove, or increasing the number of chimney valves, will not affect this distribution, provided, of course, that the one chimney valve has sufficient area. Strangulation by insufficient valve area is a common fault, not only in hot-blast stoves, but in many other types of furnaces.

In a paper before the American Iron and Steel Institute in October, 1916, Arthur J. Boynton gave a number of illustrations of current designs in hot-blast stoves, the number of passes varying from two to four. This paper and its discussion seemed to indicate that the laws governing the subdivision of streams of heating and cooling gases were not clearly understood, and this was also shown in the stove designs illustrated. The laws governing the flow of heat and the relationship between the thickness of the wall of the checker openings and the time required to saturate the heat-storage capacity of the brickwork are not

understood. The checker wall thickness ranged from 1.5 inches (38 mm) to 3 inches (75 mm), with variations in pass diameter.

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